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ABSTRACT

As consciousness becomes a more viable field of investigation and research, more attempts are being made to examine states of consciousness and their effects on certain abilities. A meta-analysis was used to examine the state of relaxation and its effects on learning, performance, and academic achievement. A search of PsychINFO, the data base of the American Psychological Association, yielded 20 studies with relevant statisitics. Each study used a control group to compare the effects of one or more of the following relaxation techniques: (1) kinesthetics; (2) progressive relaxation; (3) progressive relaxation with music; and (4) progressive relaxation with imagery. One-half of the studies involved college undergraduates and the other half involved elementary school pupils. Meta-analysis of the studies revealed that relaxation techniques, in particular progressive relaxation techniques, had a small positive effect on cognitive academic variables. Examination of the studies suggests, however, that more carefully designed and implemented studies need to be undertaken, especially in the area of relaxation techniques and affective educational outcome. (ABB)

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Relaxation and Educational Outcomes: A Meta-Analysis

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Introduction

Psychologists are once again turning their attention to the study of consciousness. Extensive writing about consciousness is appearing in professional journals and psychology texts. Groups interested in the study of consciousness are rapidly forming all over the world. It is a topic which many scholars are realizing has far reaching implications for the understanding of human beings' growth, development, learning and performance.

As is usually the case, education follows closely behind advances in psychology and this is happening in the area of consciousness. Due primarily to the work of Thomas Roberts of Northern Illinois University consciousness' education is developing into a viable field of investigation and development. One of Roberts' main points is that certain abilities are stronger in some states of consciousness than in others. Since it has been speculated that there are at least hundreds, and possibly thousands, of states of consciousness available to humans, the implications for investigation are truly incredible.

A great deal of work is in progress to investigate the effects of various states of consciousness on learning and performance. Some of it is empirically based--much of it is not. There has not been an attempt to draw together this work to determine what the effects of any one state of consciousness has on learning and performance. The purpose of this study was to examine one state of consciousness, relaxation, and through the use of meta-analysis, draw conclusions regarding the effects of relaxation on learning and performance--more specifically, academic achievement.

The focus of this study was on empirical experimental investigations so that effects could be computed and analyzed.

Two major problems immediately presented themselves in this endeavor. First, there was little standardization of techniques to facilitate relaxation and, in fact, relaxation itself was often referred to by many different names. Therefore the following categories were used to distinguish among the various forms of mind and body relaxation techniques:

a. kinesthetics

b. progressive relaxation

c. progressive relaxation and music

d. progressive relaxation and imagery

Studies were then analyzed across all of these techniques and analyzed individually according to each of the four categories. The criteria used to select relevant studies were based on whether the techniques used to facilitate an altered state of consciousness fit into one of the aforementioned categories.

Secondly, many studies use a technique to facilitate relaxation in subjects and then investigate the relationship between subjects being submitted to the technique and their achievement and performance. A major problem arose as most investigators did not monitor the physiological condition of the subjects to determine whether the subjects are exhibiting physiological indications of a relaxed state such as muscle tension monitoring, skin temperature changes, breathing changes, brain wave production or heart rate changes. Therefore it was not always possible to say that relaxation has an effect on achievement, only that the technique which should, theoretically, facilitate relaxation is related to achievement. In the present analysis studies were analyzed in two categories: 1) those studies where physiological monitoring indicated the

level of relaxation achieved by subjects and 2) those which simply assumed that the selected technique resulted in relaxation.

This study provided valuable information regarding the effects of relaxation on achievement and performance.

Method

PsychINFO, the data base of the American Psychological Association, was searched by means of DIALOG, the information retrieval service. The 20 studies that contained the relevant statistics summarizing cognitive outcomes and types of relaxation techniques included five dissertations, three convention presentations and 12 journal articles. An additional 19 studies did not contain enough statistics to compute effect sizes.

The cognitive outcome variables were either learning aptitude or school achievement, including both standardized and teacher- or researcher-made tests. Scores were obtained following the application of the relaxation treatments, thus coming from final-status variables. Some of the studies containing insufficient statistics used analysis of covariance or difference scores. Problems with these measures of dependent variables are described in Glass, McGaw, and Smith (1981).

All of the studies in the final set used a control group to compare the effects of one or more relaxation techniques. The type of relaxation technique was coded as: 1) physical body work focusing primarily on kinesthetics, 2) guided mind/body calming, including hypnosis, progressive relaxation, meditation, 3) progressive relaxation combined with music, and 4) progressive relaxation combined with imagery, fantasy, daydreaming. Each study was analyzed to determine if a measure of physiological relaxation was used to validate the relaxation treatments.

Following procedures described in Glass, McGaw, and Smith (1981), 36 effect sizes were extracted from the reports. Each effect size was found by subtracting the mean of the control group from the mean of the treatment group and dividing by the control group standard deviation. Since the sample effect size, $\hat{\Delta}$, is a biased estimate of the population effect size Δ (Hedges, 1979), each of the sample effect sizes was multiplied by a correction factor K tabled in Hedges (1981) and reproduced in Glass, McGaw, and Smith (1981). The product is an unbiased estimate of Δ. The distribution of Δ's was graphed as a stem-and-leaf display (Tukey, 1977).

Results and Discussion

The results are summarized in Table 1 and Figure 1.

Insert Table 1 and Figure 1 about here

The average effect of relaxation on cognitive outcomes when compared to a control group was .162σ. The average subject who received some relaxation technique exceeds 56% of the control subjects on the cognitive outcome variables. The 90% confidence interval of the true average Δ is .017 to .307.

The type of relaxation technique labeled progressive relaxation had an average effect of .195σ. The average subject receiving this kind of relaxation technique exceeds 58% of the control subjects on cognitive variables. The 90% confidence interval for this group is .011 to .379.

Due to the relatively small number of studies in the remaining categories of relaxation, and the degree of skewness exhibited in the distributions, it would be misleading and inappropriate to interpret average effects under the assumption of normality. Furthermore, only one study (Hull, Render & Moon,

1984) was found that checked on the validity of the relaxation treatment by administering a measure of physiological response. Therefore, the results for the total sample and the category of progressive relaxation seem to provide the strongest basis for interpretation.

About 50% of the studies used college undergraduates as subjects; the other half used elementary school pupils. Almost all of the reports featured some procedures for controlling extraneous variance, from matched controls to random assignment of subjects to groups. However, few studies reported "blind" experimenters, accounted for experimental mortality, or included a placebo. The allegiance of the experimenters relative to their commitment to relaxation techniques was not well controlled and difficult to assess.

Relaxation techniques in general, and progressive relaxation techniques in particular, have a small positive effect on cognitive academic variables among elementary school children and college-level students from these 20 studies taken as a whole. This conclusion may not reflect the actual relationship, however, due to design and treatment implementation flaws that generally plagued the analyzed reports. As more studies accumulate, it will be possible to code and compare various methodological characteristics to determine the extent to which they influence the relationship between relaxation techniques and cognitive outcomes.

Another important class of school outcomes is affective. A future meta-analysis might examine the relationship between relaxation and anxiety within educational contexts. There is perhaps a stronger theoretical framework for justifying the expectation that relaxation techniques will positively influence affective educational outcomes.

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Table 1. Descriptive Statistics of Effect Sizes for Types of Relaxation Techniques.

	Relaxation Technique				
	1[a]	2	3	4	Total
$\bar{X}$	.178	.195	.059	.211	.162
s	---	.526	.396	.932	.529
Md	.178	.232	.146	-.171	.160
Q	---	.360	.190	.585	.315
n	1	22	9	4	36

[a]1=kinesthetics, 2=progressive relaxation, 3=progressive relaxation and music, 4=progressive relaxation with imagery.

DEPTH	STEM	*	LEAVES
		*	
12	-0	Q	011233333444
13		*	5
+17	0	Md	00011112222233344
6		*	677
3	1	*	0
2		*	57
		*	
		*	

MINIMUM = -.572

MAXIMUM = 1.739

Figure 1. Stem and leaf display of effect sizes for combined groups.